

specific pathogens (Manning 1984). Instead, their defensive responses are based upon broad-spectrum antimicrobial mechanisms. These include physical barriers, such as a chemically resistant shell, and cellular responses, such as phagocytosis and encapsulation (Sparks 1985). There is increasing evidence that natural antibacterial compounds also provide an important defense in lower animals. Potent antibiotics have been recently isolated from insects (Van Hofsten et al 1985). These agents, called cecropins, are believed to be the primary antibacterial defense in certain insects (Steiner et al 1981). Other agents having potent antimicrobial activity have recently been isolated from the skin of aquatic frogs (Zaslloff 1987). Non-specific antimicrobial activity has also been reported in many different species of fishes (Ingram 1980).

Crustacean cuticle has high concentrations of phenol oxidase, which converts phenol and similar compounds into the polymer, melanin (Bang 1983). This metabolic pathway may be important in defending against microbes (e.g., through the production of free-radicals). However, this response is probably not the only mechanism which crustaceans use for protection, since shell disease lesions are often highly pigmented with melanin (e.g., "black spot"), even though the lesions continue to enlarge (Johnson 1983, McKenna et al 1988).

Protection from microbial invasion of the cuticle requires that the normal bacterial flora on the external surface of the crab be kept in check; otherwise, pathogenic changes will occur. These changes are the result of chemical degradation by these potentially pathogenic bacteria. Protection could be conferred via production of bacteriotoxic (antibiotic) substances that kill or slow the growth of bacteria that attempt to enter the cuticle.

PURPOSE AND OBJECTIVES

- 1) Determine if any antibacterial substances were present in selected crab tissues.
- 2) Partially characterize antibacterial activity that may be present.
- 3) Determine if there were any quantitative differences in the protective capabilities of individual crabs.
- 4) Determine if selected toxicants were elevated in A/P Estuary crabs.
- 5) Reproduce shell disease in blue crabs.